

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A method of determining the oil ~~content~~ fraction of a fluid emulsion comprising heavy oil and water comprising the steps of:
 - (a) providing a low field NMR relaxometer;
 - (b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil;
 - (c) determining a T_2 cutoff value;
 - (d) measuring the total amplitude of the spectrum at T_2 times less than and equal to the T_2 cutoff value (A_{oil}); and
 - (e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard of known weight (AI_{oil}).
2. (Original) The method of claim 1 wherein the temperature is about 30°C and the T_2 cutoff value is about 10 milliseconds.
3. (Currently Amended) A method of determining the water ~~content~~ fraction of a fluid emulsion comprising heavy oil and water comprising the steps of:
 - (a) providing a low field NMR relaxometer;
 - (b) measuring and recording the T_2 relaxation spectrum of the emulsion;
 - (c) determining a T_2 cutoff value;
 - (d) measuring the total amplitude of the spectrum at T_2 times greater than the T_2 cutoff value (A_w); and
 - (e) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard of known weight (AI_w).
4. (Currently Amended) The method of claim 3 further comprising the steps of determining the total weight of the sample and determining the oil ~~content~~ fraction of the emulsion by subtracting the water ~~content~~ fraction of the sample from the total weight of the sample.

5. (Currently Amended) An apparatus for determining the oil ~~content~~ fraction of a flowing fluid emulsion comprising heavy oil and water comprising:

(a) a low field NMR relaxometer having a NMR magnet positioned in proximity to a channel through which the emulsion flows, said relaxometer for measuring the T_2 spectrum of a the sample;

(b) means connected to the relaxometer for measuring total T_2 amplitude below a T_2 cutoff value value, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value; and

(c) means for converting the total T_2 amplitude value to a weight value.

6. (Original) The apparatus of claim 5 wherein the T_2 cutoff value value is about 10 milliseconds.

7. (Original) The apparatus of claim 5 wherein the relaxometer operates at less than about 2 MHz.

8. (Original) The apparatus of claim 7 wherein the relaxometer operates at about 1 MHz.

9. (Original) The apparatus of claim 5 further comprising a heater for heating the emulsion flow.

10. (Currently Amended) An apparatus for determining the oil ~~content~~ fraction of a fluid emulsion comprising heavy oil and water comprising:

(a) means for obtaining a sample of the emulsion;

(b) a low field NMR relaxometer for measuring the T_2 spectrum of the sample;

(c) means connected to the NMR relaxometer for measuring total T_2 amplitude below a T_2 cutoff value, wherein a substantial portion of the spectrum attributable to the oil is at T_2 values less than or equal to the T_2 cutoff value;

(d) means for converting the total T_2 amplitude value to a weight value.

11. (Currently Amended) A method of determining the oil ~~content~~- fraction and water ~~content~~ fraction of a fluid emulsion comprising heavy oil and water comprising the steps of:

- (a) providing a low field NMR relaxometer;
- (b) measuring and recording the T_2 relaxation spectrum of the emulsion at a temperature allowing recovery of the T_2 spectrum of the heavy oil;
- (c) determining a T_2 cutoff value;
- (d) measuring the total amplitude of the spectrum at T_2 times less than and equal to the T_2 cutoff value (A_{oil});
- (e) converting A_{oil} to a weight value by dividing A_{oil} by the amplitude index of an oil standard of known weight (AI_{oil});
- (f) measuring the total amplitude of the spectrum at T_2 times greater than the T_2 cutoff value (A_w); and
- (g) converting A_w to a weight value by dividing A_w by the amplitude index of a water standard of known weight (AI_w).